GLOSSARY

A-weighted decibel (dBA)

A unit of weighted sound pressure level, measured by the use of a metering characteristic and the "A" weighting, which favors the human ear, specified by American National Standard Institute S1.4-1971(R176). (See *decibel*).

accelerator

A device that accelerates charged particles (e.g., *electrons* or *protons*) to high velocities so they have high kinetic energy (i.e., the energy associated with motion); it focuses the charged particles into a beam and directs them against a *target*.

adsorption

The adhesion (attachment) of a substance to the surface of a solid or solid particles.

air stripper

A device that blows air through effluent, sewage, groundwater, etc., and has an aerator that removes unwanted materials such as gases, volatile organic compounds, or synthetic detergents.

aquifer

A geologic formation that contains enough saturated porous material to permit movement of groundwater and to yield groundwater to wells and springs.

As Low As Reasonably Achievable (ALARA)

An approach to radiation protection that controls or manages exposures (both individual and collective to workers and general public) as low as social, technical, economic, practical and public policy considerations permit. ALARA is not a dose limit, but a process which has the objective of dose levels as far below applicable limits of 10 CFR 835 as is reasonably achievable. Particular attention is to be paid to this definition in design of facilities.

attainment area

An area that complies with *National Ambient Air Quality Standards* (NAAQS) for criteria pollutants; a *nonattainment area* does not meet these standards.

bedrock

The solid rock underlying surface materials (as soil).

benthic

Associated with the bottom of a body of water (ocean, lake, river, stream), as in "benthic organism."

Best Management Practices (BMP)

A practice or combination of practices that is determined by a state (or other planning agency) to be the most effective, practicable means of preventing pollution generated by nonpoint sources or reducing it to a level compatible with air or water quality goals.

beyond-design-basis accident

A beyond-design-basis accident is more severe than the design-basis accident. It generally involves multiple failures of engineered safety systems and has an occurrence probability of less than 10^{-6} per year.

bounding accident

An accident whose calculated consequences encompass all other possible accidents for that facility. For example, a bounding accident for the release of hazardous material from a storage tank would postulate the release of the entire tank contents. The consequences from this accident would be greater than the consequences of all other tank release scenarios.

bounding analysis

See bounding accident.

Carolina bay

Oval-shaped, intermittently flooded, marshy depression that occurs abundantly on the Coastal Plain of the Carolinas.

cesium

Naturally-occurring element with 55 protons in its nucleus. A radioactive isotope of cesium, cesium-137, is a common fission product.

cladding

The material that covers fuel and target assemblies in nuclear reactors.

colocated worker

A worker on the SRS who is not involved with the operation of the facility being evaluated or under the control of the Emergency Plan of that facility.

commercial light-water reactor

A reactor that uses regular water as the neutron moderator. Commercial reactors are owned and operated by utilities to produce electricity for consumers.

committed dose equivalent

The calculated *dose equivalent* received by a tissue or an organ during the 50-year period after a *radionuclide* is introduced into the body.

committed effective dose equivalent

The sum of the *committed dose equivalents* to various tissues/organs in the body multiplied by their appropriate tissue weighting factor. Equivalent in effect to a uniform external dose of the same value.

community (environmental justice)

A group of people or a site in a specified area exposed to industrial risks that could threaten health, ecology, or land values, or exposed to unwanted noise, smell, industrial traffic, particulate matter, or other unaesthetic impacts.

conceptual design

Name for the process to develop a facility that will meet project goals while ensuring feasible and attainable performance levels; develop project criteria and design parameters for all engineering disciplines; and identify applicable codes and standards, quality assurance requirements, environmental studies, construction materials, space allowances, energy conservation features, health and safety safeguards, security requirements, and other features or requirements of the project.

confining unit
A body of impermeable or distinctly less permeable material stratigraphically adjacent to one or more *aquifers*.

confluence
The point where two streams meet.

consequence
The result or effect (especially projected exposure to radiological or chemical hazards) of a release of hazardous materials to the environment.

crack
To break a compound into simpler molecules.

crud
For the purposes of this EIS, crud (short for Chalk River Unidentified Deposits) refers to oxidation residue attached to targets.

cryogenic distillation
Cryogenic distillation is used to separate different hydrogen isotopes.

cumulative impacts
Impacts on the environment including additive ecological, health, or socioeconomic effects that result from the addition of the impact of the proposed action to impacts from other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes the other actions (40 CFR 1508.7).

decay (radioactive)
The spontaneous transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. The process results in the emission of nuclear *radiation*.

decibel
A unit for measuring the relative loudness of sounds. In general, a sound doubles in loudness for every increase of 10 decibels.

decision maker
Group or individual responsible for making a decision on constructing and operating a tritium extraction facility at the Savannah River Site. Decision makers include DOE officials as specified in DOE Order 451.1A; elected officials; Federal, state, and local agency representatives; and the public.

Defense Waste Processing Facility
Savannah River Site facility that processes high-level radioactive waste into a glass form for transport to a permanent disposal site.

deflagration
Rapid burning with great heat and intense light.

deinventory
Packaging unused nuclear materials and placing them in storage on the SRS or at their source.

demographic

Related to the statistical study of human populations, including size, density, distribution, and vital statistics such as age, gender, and ethnicity.

design-basis accident

For nuclear facilities, a postulated abnormal event used to establish the performance requirements of structures, systems, and components to (1) maintain them in a safe shutdown condition indefinitely or (2) prevent or mitigate the consequences of an accident to the general public and operating staff (i.e., prevent exposure to radiation in excess of appropriate guideline values). Normally, a design-basis accident is the accident that causes the most severe consequences when engineered safety features function as intended. **Typically these events have an occurrence probability of greater than 10^{-6} per year.**

design-basis events

The set of events that serve as part of the basis for the establishment of design requirements for systems, structures, and components within a facility.

dose

The energy imparted to matter by *ionizing radiation*. The unit of absorbed dose is the *rad*, which is equal to 0.01 joule per kilogram of irradiated material in any medium.

dose equivalent

A term used to express the amount of effective radiation when modifying factors have been considered. It is the product of absorbed dose (rads) multiplied by a quality factor and other modifying factors. It is measured in rem (Roentgen equivalent man).

dry storage area

An area in the remote handling area of the tritium extraction facility that will store incoming storage/shipping containers. Shielding of stainless steel and concrete will protect personnel.

E-Area Waste Storage Facility

Facilities on the Savannah River Site (SRS) that store wastes generated by SRS activities.

ecosystem

The community of living things and the physical environment in which they live.

effluent

A liquid or airborne material released to the environment; in common usage, a liquid release.

effluent monitoring

The collection and analysis of samples to measure liquid and gaseous effluents to characterize and quantify contaminants, to assess *radiation exposure* to members of the public, and to demonstrate compliance with applicable standards effluent monitoring; occurs at the point of discharge, such as an air stack or drainage pipe.

EIS (environmental impact statement)

A legal document required by the National Environmental Policy Act (NEPA) of 1969, as amended, for Federal actions involving significant or potentially significant environmental impacts. A tool for decisionmaking, it describes the positive and negative impacts of the proposed action and the alternative actions.

electron

An elementary particle with a mass of 9.107×10^{-28} gram (or 1/1837 of a *proton*) and a negative charge. Electrons surround the positively charged nucleus and determine the chemical properties of the atom.

emission standards

Legally enforceable limits on the quantities and kinds of air contaminants that may be emitted to the atmosphere.

environment

The sum of all external conditions and influences affecting the life, development, and ultimately the survival of an organism.

environmental justice

The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no population of people should be forced to shoulder a disproportionate share of the negative environmental impacts of pollution or environmental hazards due to a lack of political or economic strength.

environmental surveillance

The collection and analysis of samples of air, water, soil, foodstuffs, biota, and other media and the measurement of external *radiation* to demonstrate compliance with applicable standards, assess radiation exposures to members of the public, and assess effects, if any, on the local environment.

exposure (to radiation)

The incidence of *radiation* on living or inanimate material by accident or intent. Background exposure is the exposure to natural background ionizing radiation. Occupational exposure is the exposure to ionizing radiation that occurs during a person's working hours. Population exposure is the exposure to a number of persons who inhabit an area.

exposure pathway

The way a chemical or physical agent gets from its source to an organism. The pathway describes the way an individual or population is exposed to the chemical or physical agent. Each exposure pathway must have a source, a release from the source, an exposure point, and a method of exposure (ingestion, breathing, etc.). If the exposure point differs from the source, a transport/exposure medium (e.g., air) and an exposure route is included in the pathway.

extraction basket

Hardware that hold a bundle of reactor targets (tritium sources) during the high temperature extraction process which releases tritium and other process gases.

fault (geological)

A fracture in the earth's crust accompanied by a displacement of one side in relation to the other.

floodplain

The relatively flat valley floors adjacent to and formed by rivers subject to flooding. When the river floods, the floodplain is inundated.

getters

The material in a target rod that collects the tritium produced when the rod is in a reactor.

glovebox

Large sealed enclosure that contains equipment used to process hazardous materials. A glovebox is normally constructed of stainless steel with large acrylic/lead glass windows. Workers are physically separated from the hazardous material, but can manipulate the equipment with heavy-duty, lead-impregnated rubber gloves, whose cuffs are sealed in portholes in the glovebox windows.

gross regional product

The total value of the goods and services produced in a defined region.

half-life (radiological)

The time it takes for the radioactivity of a *radioactive isotope* to decay by half. Half-lives vary from millionths of a second to billions of years.

hazard analysis

A comprehensive assessment of facility hazards and/or accidents that could produce undesirable consequences for the onsite population, the public, and/or the environment. Included in the analysis are hazard identification, screening for common hazards, postulation of release events, screening for hazardous release events, defense-in-depth evaluation, and risk grouping of events.

hazardous waste

Waste (solid, semisolid, or liquid) with the characteristics of ignitability, corrosivity, toxicity, or reactivity, as defined by the *Resource Conservation and Recovery Act* and identified or listed in 40 CFR 261 or the Toxic Substances Control Act.

heavy water

Water in which the hydrogen of the water molecule consists entirely of the heavy hydrogen isotope having a mass number of 2; also called deuterium oxide (D_2O).

heavy water reactor

A nuclear reactor in which *heavy water* serves as a neutron moderator and sometimes as a coolant.

HEPA filters

High Efficiency Particulate Air filters filter air and gases to remove particulate matter that is smaller than a micron.

high-level waste

The highly *radioactive* wastes that result from the chemical processing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid. High-level waste contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation.

HVAC fans

Heating, ventilation, and air conditioning fans.

hydrogen isotope separation
System used to separate different hydrogen isotopes using the TCAP process (see below).

incineration
The efficient burning of combustible solid and liquid wastes to destroy organic constituents and reduce the volume of the waste. The greater the burning efficiency, the cleaner the air emission. Incineration of *radioactive* materials does not destroy the *radionuclides* but does significantly reduce the volume of the waste.

inerted
For the purposes of this EIS, a term to describe the process of replacing the air in a confined space with nitrogen gas.

inert module
A container, filled with non-reactive gas, where targets are prepared remotely for tritium extraction.

inert separation
For the purposes of this EIS, a system used to separate nitrogen or inert gases from hydrogen isotopes.

inert transporter
For the purposes of this EIS, a transporting device filled with nitrogen gas to prevent a chemical reaction. Targets are moved among inert modules and to the furnace in the inert transporter.

infrastructure
The system of public works of a county, state, or region; also, the resources (buildings or equipment) required for an activity.

irradiated
A term to describe target rods that have been exposed to *radiation* in a reactor such as commercial light water reactor.

irradiation
Exposure to *radiation.*

isotope
An isotope of a chemical element has the same atomic number (i.e., number of protons) but has a different atomic mass (i.e., number of neutrons plus protons) than other isotopes of the same element. That is, although the number of protons always remains fixed for an element, the number of neutrons may vary, giving rise to different isotopes of that element. Isotopes of an element display identical chemical properties. Isotopes may be radioactive.

jurisdictional wetlands
Wetlands that are protected by the Clean Water Act. The U.S. Army Corps of Engineer requires a permit to fill or dredge jurisdictional wetlands.

latent cancer fatalities
Deaths resulting from cancer that became active sometime after the exposure to the carcinogen that induced the cancer.

laydown
Area of construction site used to sort and store construction materials.

LiAl
The chemical symbols for lithium and aluminum and which describes one type of target that could be irradiated in an accelerator to produce tritium.

light water
Term used to distinguish ordinary water from heavy water. (A light water reactor uses ordinary water as the neutron moderator.) Heavy water, on the other hand, is D_2O, deuterium oxide. Deuterium is an isotope of hydrogen with an atomic mass of 2 or twice that of hydrogen.

light-water reactor
A nuclear *reactor* that uses ordinary water to moderate (reduce the energy of) the *neutrons* created in the core by fission reactions.

low-income community
A community in which 25 percent or more of the population lives in poverty.

low-level waste
Radioactive waste not classified as *high-level waste*, transuranic waste, *spent nuclear fuel*, or byproduct material.

maximally exposed individual
A hypothetical member of the public at the SRS boundary who receives the maximum possible *dose equivalent* from a given exposure scenario.

metal hydride bed
A vessel filled with a metal which will form a hydride when exposed to hydrogen isotopes. These beds are typically used for storage of hydrogen isotopes.

millirem
One thousandth of a *rem*. (See *rem*.)

minority communities
A community whose minority population is equal to or greater than the average minority population of a defined area or jurisdiction. A minority is classified by the U.S. Bureau of the Census as Black, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, or other nonwhite persons.

mixed waste
Waste material that contains both *hazardous waste* and *radioactive*, special nuclear, or byproduct material (subject to the Atomic Energy Act of 1954).

National Ambient Air Quality Standards
Air quality standards established by the Clean Air Act, as amended in 1990. The primary National Ambient Air Quality Standards are intended to provide the public with an adequate margin of safety, and the secondary National Ambient Air Quality Standards are intended to protect the public from known or anticipated adverse impacts of a pollutant.

National Pollutant Discharge Elimination System
Federal system that permits liquid effluents regulated through the Clean Water Act, as amended.

National Register of Historic Places
A list maintained by the Secretary of the Interior of districts, sites, buildings, structures, and objects of prehistoric or historic local, state, or national significance.

neutron
An uncharged nuclear particle that has a mass approximately the same as that of a *proton*; it is present in all atomic nuclei except that of hydrogen-1. A free neutron is unstable and decays with a half-life of about 13 minutes into an electron and a proton.

nitrogen inerted
Describes when the internal atmosphere of a system, structure or device completely consists of nitrogen.

nitrogen inerted modules
Describes when a module's internal atmosphere consists completely of nitrogen.

nonattainment area
See *attainment area*.

nuclide
An atomic nucleus specified by atomic weight, atomic number, and energy state; a *radionuclide* is a radioactive nuclide.

overpacking
The act of placing packaged radioactive waste into a second container for transport and/or disposal. At TEF, extracted targets and the extraction basket would be placed into a steel tube (the overpack) designed to go into an SRS waste storage facility.

oxides of nitrogen (NO_x)
Primarily nitrogen oxide (NO) and nitrogen dioxide (NO_2), these compounds are produced in the combustion of fossil fuels, and contribute to air pollution.

ozone
A compound of oxygen in which three oxygen atoms are chemically attached to each other. Ozone is an air pollutant.

pellets
One configuration of the reactive material in a target rod.

person-rem
The measure of radiation dose commitment to a specific population; the sum of the individual doses received by a population.

pH
A measure of the hydrogen ion concentration in an aqueous (made from, with, or by water) solution. Pure water has a pH of 7, acidic solutions have a pH less than 7, and basic solutions have a pH greater than 7.

pre-conceptual design

Pre-conceptual design involves the development of the preliminary information necessary to define a project. This preliminary information consists of (1) Statement of Mission Need (why the project is needed), (2) preliminary functional and technical requirements (how the project will satisfy the need), and (3) the development of the preliminary budgetary information (very rough estimate of the total cost of the project). This preliminary information is then used to obtain DOE Program office approval to proceed into the further developmental stages of the project.

process hood

An enclosure which contains equipment for processing tritium. A process hood is maintained at a slight negative pressure with a high velocity air in-flow.

process stripper

Equipment used to reduce the concentration of unwanted materials in air or some other gaseous atmosphere.

proton

A nuclear particle with a positive charge equal in magnitude to the negative charge of the *electron*; it is a constituent of all atomic nuclei, and the atomic number of an element indicates the number of protons in the nucleus of each atom of that element.

quantitative analysis

Analysis that uses precise values.

radiation

The emitted particles and photons from the nuclei of *radioactive* atoms; a short term for *ionizing radiation* or nuclear radiation, which is different from nonionizing radiation such as microwaves, ultraviolet rays, etc.

radioactivity

The spontaneous decay of unstable atomic nuclei accompanied by the emission of *radiation*.

radiological

Related to *ionizing radiation*.

radionuclide

See *nuclide*.

reactor

A device in which a chain reaction of fissionable material is initiated and controlled; a nuclear reactor.

receptor

The individual being affected by radiation or a chemical hazard.

Record of Decision (ROD)

A document that provides a concise public record of an agency decision on a proposed action described in an EIS. An ROD identifies the alternatives, the environmentally preferable alternative(s), factors the agency balanced in making the decision, and whether the agency has adopted all practicable means to avoid or minimize environmental harm and if not, why not.

release fraction

The calculated percent of total material in a facility that could be released in a particular accident.

rem (Roentgen equivalent man)

The unit of dose equivalent for human exposure to radiation. It is equal to the product of the absorbed dose in rads and a quality factor.

remote handling cell

A room designed so that the process carried out in the room is done remotely by operators manipulating robotic equipment.

Resource Conservation and Recovery Act

The Act that provides, among other things, a system for managing hazardous waste from its generation until its ultimate disposal.

Richter Scale

A scale for measuring earthquakes with graded steps from 1 to 10. Each step is about 60 times greater than the preceding step, adjusted for different regions of the earth.

risk

In a radioactive accident analysis, the probability-weighted consequence of an accident, defined as the accident frequency per year multiplied by the dose. Risk also is used commonly in other applications to describe the probability of an event occurring times the consequences of the event.

sanitary waste

Solid waste that is neither hazardous as defined by the *Resource Conservation and Recovery Act* nor *radioactive*; sanitary waste streams include paper, glass, discarded office material, and construction debris.

seismicity

Capacity for earth-movement events, usually earthquakes.

shielded transport casks

A heavily shielded container designed to hold one or more tritium targets during transport.

shipping bay

An opening or recess in a building where materials are loaded or unloaded for shipping.

spent target rods

Target rods that have had their tritium extracted.

stripper system
A decontamination system that removes tritium and water vapors from the nitrogen atmosphere circulating through *inerted* process gloveboxes.

sulfur dioxide
A heavy, pungent, toxic gas, used as a preservative or refrigerant, that is an air pollutant.

Target/target of similar design
A tube, rod, or other form containing material that, on being irradiated in a *nuclear reactor* or an *accelerator*, would produce a desired end product.

Thermal Cycling Absorption Process (TCAP)
A system that separates different hydrogen isotopes in a hydrogen gas stream.

tier
To link to another in a hierarchical chain. An upper-tier document might be programmatic to the entire DOE complex of sites; a lower-tier document might be specific to one site or process.

tritium
A *radioactive isotope* of hydrogen and an essential component of every warhead in the current and projected U.S. nuclear weapons stockpile. Tritium enables warheads to perform as designed.

Tritium Extraction Facility
A proposed facility at SRS that would extract tritium from *target* material irradiated in either an *accelerator* or a commercial light-water *reactor*.

Tritium-producing burnable absorber rods (TPBARs)
A highly radioactive target rod which contains recoverable tritium after irradiation in a reactor.

Tritium Separation Facility
A proposed facility at SRS that would separate hydrogen isotopes (protium, deuterium, and tritium) from helium using metal hydride beds that would absorb hydrogen and allow helium to pass through, and that would separate tritium from the other hydrogen isotopes using cryogenic distillation.

uninvolved worker
For this EIS, an SRS worker who is assumed to be 640 meters from a point of release.

water quality standards
Provisions of Federal or state law that consist of a designated use or uses for the waters of the United States and water quality standards for such waters based on their uses. Water quality standards are used to protect the public health or welfare, and enhance the quality of water.

way stations
Modules located inside the remote handling area of TEF. Their purpose is to capture gases that may be emitted from partially extracted target rods.

wetlands

Land exhibiting the following: hydric soil conditions, saturated or inundated soil during some portion of the year, and plant species tolerant of such conditions; also, areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

zeolite bed

A vessel that recovers tritiated and non-tritiated waters from process gas streams and converts them to gas of various hydrogen isotopes for later recovery of tritium. The waters are driven off the zeolite beds by heating for recovery of tritium.